CLAIMS

1. A dry pump comprising a stator housing first and second intermeshing rotors adapted for counter-rotation within the stator, and means for effecting axial movement of the rotors within the stator to vary at least one clearance between the rotors and the stator during use of the pump.

2. A pump according to Claim 1, wherein the means for effecting axial movement of the rotors is configured to effect axial movement of the rotors in response to an axial load generated in the rotors during operation of the pump.

3. A pump according to Claim 2, wherein each rotor is mounted on, or integral with, a respective shaft rotatably mounted within the pump.

4. A pump according to Claim 3, comprising a bearing assembly for rotatably supporting the shafts relative to the stator, the means for effecting axial movement of the rotors being configured to move the bearing assembly relative to the stator.

5. A pump according to Claim 4, wherein the bearing assembly is free to move in an axial direction within a housing, the means for effecting axial movement of the rotors comprising a spring mechanism arranged with respect to a rotor such that when the rotor is subjected to an axial load, the spring mechanism compresses or extends causing an axial reactive load, whereby to vary an axial position of the rotor over time.

6. A pump according to Claim 5, wherein the spring mechanism comprises a setting spring positioned in the housing between the bearing assembly and an end surface of the housing.

7. A pump according to Claim 5 or Claim 6, wherein the housing is a cylindrical housing having an end surface extending radially inwardly toward the rotor.

8. A pump according to any of Claims 5 to 7, wherein the spring mechanism is selected such that the maximum axial load to which a rotor is likely to be subjected does not exceed the elastic limit of the spring mechanism.

9. A pump according to Claim 1, comprising control means for actively controlling operation of the means for effecting axial movement of the rotors.

10. A pump according to Claim 9, wherein the means for effecting axial movement of the rotors comprises an actuator, the control means being configured to control actuation of the actuator and thereby control the axial position of the rotors.

11. A pump according to Claim 10, wherein each rotor is mounted on, or integral with, a respective shaft rotatably mounted within the pump, the actuator being configured to axially move the shafts and thereby effect axial movement of the rotors.

12. A pump according to Claim 10 or Claim 11, wherein the means for effecting axial movement of the rotors comprises a motor for rotating a drive shaft engaging the actuator, the control means being configured to control operation of the motor so as to axially move the actuator relative to the stator with rotation of the drive shaft.

13. A pump according to Claim 12, wherein the drive shaft comprises a lead screw passing through a conformingly-threaded aperture in the actuator.

14. A pump according to any of Claims 11 to 13, comprising a bearing assembly for rotatably supporting the shafts relative to the stator, the actuator being configured to move the bearing assembly relative to the stator.

15. A pump according to Claim 14, wherein the actuator comprises part of a housing for the bearing assembly.

16. A pump according to Claim 15, wherein the housing includes an internal pump sealing mechanism.

17. A pump according to Claim 15 or Claim 16, wherein the housing defines an end surface of the stator.

18. A pump according to any of Claims 12 to 17, wherein the bearing assembly supports one end of each of the rotors, a second bearing assembly being provided for supporting the other end of each of the rotors.

19. A pump according to Claim 18, wherein the second bearing assembly is arranged to move axially with axial movement of the rotors.

20. A pump according to Claim 19, wherein a housing of the second bearing assembly includes an internal pump sealing mechanism.

21. A pump according to Claim 19 or Claim 20, wherein a housing of the second bearing assembly defines an end surface of the stator.

22. A pump according to any of Claims 9 to 21, wherein the control means comprises means for detecting the value of an operational parameter of the pump, and is configured to control the means for effecting axial movement of the rotors in response to the detected value of the operational parameter.

23. A pump according to Claim 22, wherein the operational parameter comprises one of the temperature of the stator, the temperature within the stator, backpressure, the power consumption of the pump and the pressure at the inlet of the pump.

24. A pump according to any of Claims 9 to 23, wherein the control means comprises a sensor for detecting the size of the clearance between the rotors and the stator, and is configured to control the means for effecting axial movement of the rotors in response to the detected size of the clearance.

25. A pump according to any of Claims 9 to 23, wherein the control means comprises a sensor for detecting the rate of change of the clearance between the rotors and the stator, and is configured to control the means for effecting axial movement of the rotors in response to the detected rate.

26. A pump according to Claim 24 or Claim 25, wherein the sensor comprises a Hall effect sensor.

27. A pump according to any of Claims 9 to 26, wherein the control means is configured to control the means for effecting axial

movement of the rotors to sequentially increase and decrease the size of the clearance during use of the pump.

28. A pump according to any of Claims 9 to 27, wherein the control means is configured to control operation of the means for effecting axial movement of the rotors such that the rate of increase of the size of the clearance is different to the rate of decrease of the size of the clearance.

29. A pump according to any preceding claim, wherein at least part of each rotor has an outer diameter that tapers decreasingly in a direction from a pump inlet to a pump outlet.

30. A pump according to Claim 29, wherein only part of each rotor has an outer diameter that tapers towards the pump outlet.

31. A pump according to any preceding claim, wherein the rotors have a Roots profile.

32. A pump according to any of Claims 1 to 30, wherein the rotors have a Northey profile.

33. A pump according to any of Claims 1 to 30, wherein the rotors are externally threaded rotors.

34. A method of controlling operation of a pump comprising a stator housing first and second intermeshing rotors adapted for counter-rotation within the stator, the method comprising the steps of axially moving the rotors relative to the stator to increase an axial clearance between the rotors and the stator when rotors are stationary, subsequently starting rotor rotation, and, during rotor rotation, axially

moving the rotors relative to the stator to decrease the axial clearance between the rotors and the stator.

35. A method according to Claim 34, further comprising the steps of subsequently increasing and decreasing the axial clearance during use of the pump to remove deposits from the axial clearance.

36. A method according to Claim 35, wherein the axial clearance is periodically increased and decreased during use of the pump.

37. A method of controlling operation of a pump comprising a stator housing first and second intermeshing rotors adapted for counter-rotation within the stator, the method comprising the steps of sequentially axially moving the rotors in opposite directions relative to the stator to periodically vary an axial clearance between the rotors and the stator to remove deposits from the axial clearance.